Differential susceptibility of retinal ganglion cell subtypes in acute and chronic models of injury and disease.

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Public Summary:
Retinal ganglion cells (RGCs) are a heterogeneous population of neurons, comprised of numerous subtypes that work synchronously to transmit visual information to the brain. In blinding disorders such as glaucoma, RGCs are the main cell type to degenerate and lead to loss of vision. Previous studies have identified and characterized a variety of RGC subtypes in animal models, although only a handful of studies demonstrate the differential loss of these RGC subtypes in response to disease or injury. Thus, efforts of the current study utilized both chronic (bead occlusion) and acute (optic nerve crush, ONC) rat models to characterize disease response and differential loss of RGC subtypes. Bead occlusion and ONC retinas demonstrated significant RGC loss, glial reactivity and apoptosis compared to control retinas. Importantly, bead occlusion and ONC retinas resulted in differential subtype-specific loss of RGCs, with a high susceptibility for alpha- and direction selective-RGCs and preferential survival of ipRGCs. Results of this study serve as an important foundation for future experiments focused on the mechanisms resulting in the loss of RGCs in optic neuropathies, as well as the development of targeted therapeutics for RGC subtype-specific neuroprotection.

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